Geophysical Research Abstracts, Vol. 7, 01334, 2005
SRef-ID: 1607-7962/gra/EGU05-A-01334

Detection of the nonrandom component in a seismic process for the Pacific region: the results of observation data analysis and computer-assisted simulations.

E. Sasorova, B. Levin

Shirshov Institute of Oceanology Russian Academy of Sciences,
(sasor@orc.ru/+70951245983)

Recent research has shown that the Earth's seismicity and probability of the earthquake occurrence depends on the astronomical reasons: the geographical latitude and longitude of the event, the relative attitude of the Earth, the Sun and the Moon. The work consists of two parts: the analysis of the observation data from worldwide seismic catalogs (ISC, NEIC) and analysis of the results obtained from digital model using. The events with 4<=Mb<8 from 1966 were chosen from ISC and events with 7<=Ms<10 from 1973 were chosen too from NEIC (a total number of events more than 200000). The aftershocks were canceled. All events were subdivided into following magnitude levels: 4<=Mb<4.5; 4.5<=Mb<5; 5<=Mb<5.5; 5.5<=Mb<6.0; 6<=Mb<6.5; 6.5<=Mb; 7<= MS <7.5; 7.5<= MS <8.0 and 8.0<=MS. The distribution-free test (run test) was used for existence proof of nonrandom component into time sequences. It was shown that the time sequences of the EQ switching between the Northern and Southern parts of the Pacific region contain statistical significant nonrandom component for the events with 4.0<=Mb<6.0. The nonrandom component did not observed for the events with H>70 km (for every magnitude intervals). The presence of nonrandom component for the shallow seismic event indicates that the equal factors affect on the Earth surface and it may be the external factors such as tidal forces. Then the time sequences for each magnitude level were subdivided into several subintervals. The duration of subintervals was chosen as 10, 8, 4 and 2 years. The statistical validity of nonrandom component existence into subintervals for all magnitude levels was estimated. The digital model (superposition of random processes and periodic process) was proposed. The set of calculating experiments with model was carried out and the existence conditions of statistical significance of the

periodic component in compound process were defined. It was found that statistical significance of the periodic component in according to run test depends on ratio frequency of periodic component and the size of the sample sequence. The calculating experiments enable to comprehend some particular feature of the observation data.